MECHANICS OF INFINITESIMAL TEST BODIES ON DELAUNAY SURFACES: SPHERES AND CYLINDERS AS LIMITS OF UNDULOIDS AND THEIR ACTION-ANGLE ANALYSIS

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Abstract. This paper discusses the motion of infinitesimal gyroscopes along the two-dimensional surfaces of constant mean curvature embedded into the three-dimensional Euclidean space. We have considered the cases of unduloids, spheres, and cylinders for which the corresponding Hamilton-Jacobi equations are written and analyzed with the help of the action-angle variables. Spheres and cylinders are considered as limiting cases of unduloids and the residue analysis was performed which provides the connection between all three action variables and the energy. This has been traced also for the geodetic situations and for two additional classical model potentials.

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